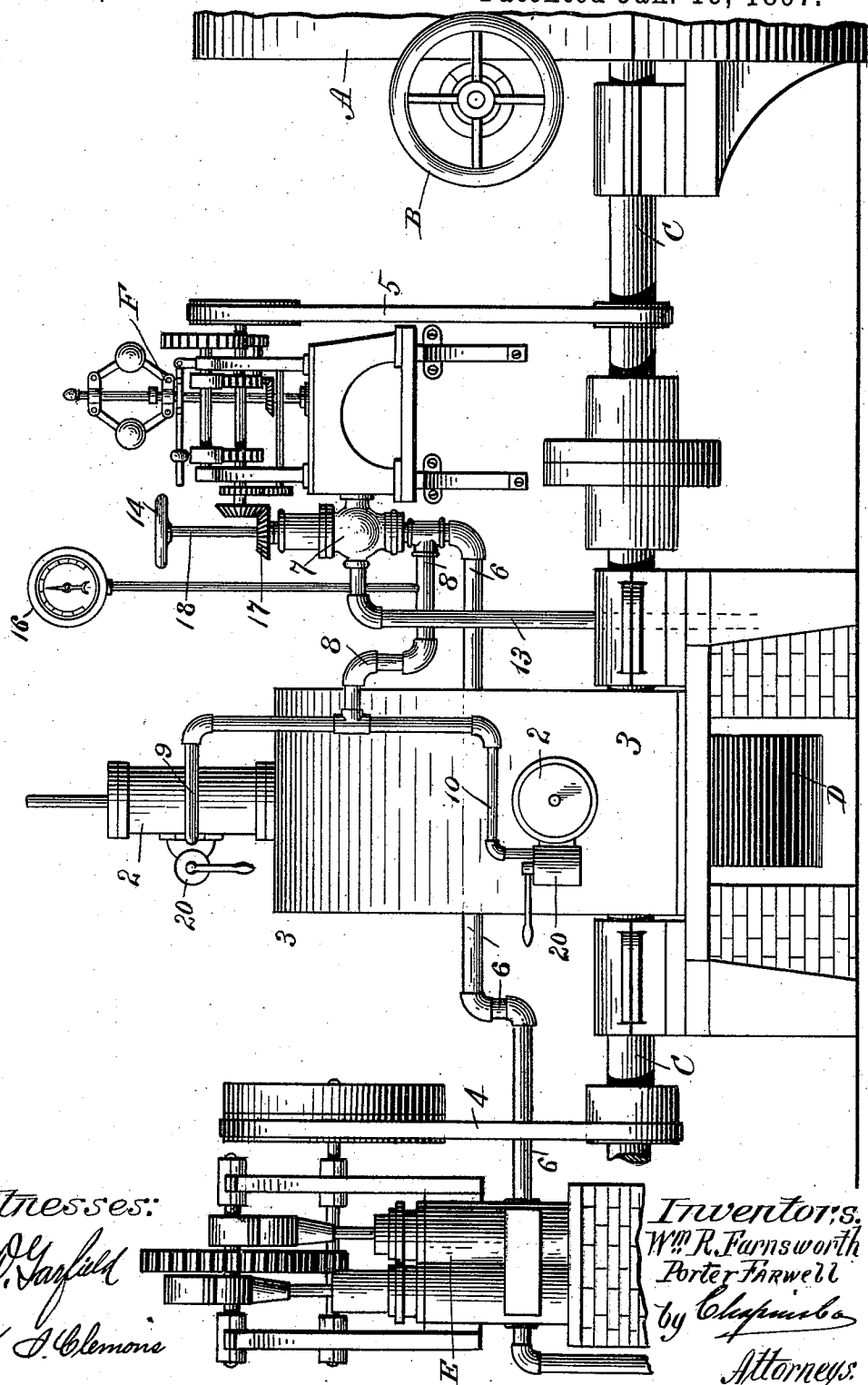


(No Model.)

W. R. FARNSWORTH & P. FARWELL.
WOOD PULP GRINDING MECHANISM.

No. 575,600.

Patented Jan. 19, 1897.



UNITED STATES PATENT OFFICE.

WILLIAM R. FARNSWORTH AND PORTER FARWELL, OF TURNER'S FALLS,
MASSACHUSETTS.

WOOD-PULP-GRINDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 575,600, dated January 19, 1897.

Application filed June 4, 1896. Serial No. 594,286. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM R. FARNSWORTH and PORTER FARWELL, citizens of the United States of America, residing at Turner's Falls, in the county of Franklin and State of Massachusetts, have invented new and useful Improvements in Wood-Pulp-Grinding Mechanism, of which the following is a specification.

This invention relates to wood-pulp-grinding mechanism, and has for its object the improvement of means for governing the supply and pressure of the water delivered to the hydraulic feeding-cylinders; and it consists in the construction and arrangement of said mechanism, all as hereinafter described and claimed.

The drawing illustrates one of a series of grindstones mounted on a shaft geared directly to the water-wheel shaft and showing the pump and governing devices therefor.

In the grinding of wood-pulp as generally practiced at present three or four grindstones are mounted on a shaft geared directly to the water-wheel shaft, each stone being provided with a pump for furnishing water thereto, and the governor for regulating the speed of the said main shaft is connected for action directly on the water-wheel gate. Such a governor is necessarily of relatively slow action, owing to the weight of the parts to be moved and the resistance to which they are subjected. The consequence is that while such adjustment is taking place through the said slow action of the governor devices a very considerable amount of pulp is ground, which varies greatly from normal fineness whenever the load on the shaft is varied by throwing off one or more stones, or vice versa. These objections are all obviated by the construction and arrangement of the governing devices, as set forth hereinafter.

In the drawing, A represents the casing of a water-wheel. B is the gate-wheel, by which the supply of water is admitted to said water-wheel.

C is the main shaft, geared directly to the wheel-shaft, as usual.

D is a grindstone, and E is a pump for furnishing water to the hydraulic feeding-cylinders 2 on the casing 3 thereof.

Thus far the arrangement of parts is like that generally adopted in setting stones for pulp-grinding. Only one stone is shown in the drawing, but in practice several are mounted on the same shaft, as stated.

The pump E, of the usual pattern, is belted up directly from the main shaft, as shown. One of said pumps is furnished for two or more stones on the shaft-line. The governor F is likewise belted up directly from said main shaft. Said pump and governor-belts are indicated by 4 and 5. A delivery-pipe 6 from said pump is connected, as shown, to the bottom of a regulating-valve 7, and below said valve a branch 8 is made therefrom, by which the water is carried through pipes 9 and 10 to the hydraulic feeding-cylinders 2. These cylinders are of the usual pattern and contain the blocks of wood to be ground, said blocks being placed under the pistons of said cylinders, and the water delivered to said cylinders supplies the pressure necessary to hold said blocks forcibly against said stone and also to supply to said blocks the necessary amount of water to accomplish the grinding thereof under the best conditions.

An amount of water in excess of the capacity of the branch pipes 9 and 10 is always supplied thereto by the pipe 6, said excess of water passing through the regulating-valve 7 and from said valve into the waste-pipe 13, said valve 7 being opened by the hand-wheel 14 when the stone is put into operation to a degree sufficient to give the required pressure on said feeding-cylinders, which will be indicated by the pressure-gage 16.

Any desired form of governor may be used the construction of which adapts it to be properly connected to the bevel-gear 17 of the valve-stem 18 of said regulating-valve or in any other suitable manner. When the stone has been started and the pressure of water supplied to said cylinders 2 regulated so as to produce the desired quality and quantity of pulp, said water-pressure is maintained on each stone independently of the others by the action of the governing devices F, connected to each of said stones, which, whenever any variation in the speed of the main shaft C occurs, instantly operate to open

or close the regulating-valve, whereby the quantity of water which is always escaping through the waste-pipe 13 is either increased or diminished, said amount being decreased
5 as the speed of the shaft C decreases, and vice versa. Said pressure and supply of water being thus always maintained in a practically constant ratio to the revolution of the stones, the quality of the product of the
10 latter is most uniform, and by reason of the great power required to run a series of three or four of these stones, (as they are usually set up,) which amounts to several hundred horse-power, the variations in speed are at
15 times very great, as it not infrequently happens that two or more of the usual pockets beneath the cylinder 2 are suddenly thrown out of action at once for refilling the same with wood—that is, it becomes necessary to close
20 the valves 20 of the cylinders 2 to put in a supply of wood, as stated, and thus all the power of the water-wheel is thrown onto the remaining pockets, the speed of which is greatly increased, but the immediate action
25 of the governor attached to the valve serves to close the latter and instantly cause the shaft C to assume its normal speed. Thus the speed of the stone is so regulated that it acts under the best conditions for grinding,
30 and the danger of exploding a stone by reason of excessive speed is obviated and at the same time more pulp is ground consequent upon the increased pressure on the remaining pockets. Meanwhile the speed of the pump
35 has also been increased proportionately, but the regulating-valve remains in the same position, and the consequence is that without the within-described regulating devices the relative proportions between the pressure of
40 water in the cylinders 2 and the circumferential speed of the stone varies to such an extent that the production of uniform pulp is practically impossible without great care on the part of the operatives to be ready to in-

stantly operate the regulating-valve by hand 45 whenever a pocket is to be thrown off, whereas with the stones and pockets acting under the control of said governing devices, as herein described and shown, the regulation of the feed is automatic and always in proportion 50 to the speed of the stone, and the product of such stones is not only infinitely more uniform, but a considerable saving is effected in the production thereof, as the amount of labor now required can be divided among a greater 55 number of grindstones.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The within-described wood-pulp-grinding mechanism consisting of a main shaft, a grindstone mounted thereon, hydraulic feeding-cylinders located in operative relation to said stone, a pump for supplying water to said cylinders and said stone, a valve for regulating the said water-supply, a governing device driven by said main shaft and suitable means of connection between said governing device and said valve for operating the latter; substantially as described. 60 70

2. The within-described wood-pulp-grinding mechanism consisting of a main shaft, a grindstone mounted thereon, hydraulic feeding-cylinders located in operative relation to said stone, a pump for supplying water to said cylinders and said stone in excess of the amount required by said feeding-cylinders and stone, a valve for regulating the discharge of said surplus water, a governing device driven by said main shaft and suitable 75 80 means of connection between said governing device and said valve for operating the latter, substantially as described.

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Witnesses:

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